

2. On the Formation of the Coral-reefs on the N.W. Coast of Australia. By P. W. BASSETT-SMITH, R.N., F.Z.S.

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Mr. J. Stanley Gardiner has, in his most interesting paper read before the International Zoological Congress at Cambridge last August, again brought the question of the formation of Coral-reefs prominently before the scientific world. The character of the reefs at depths at which corals do not as a rule grow luxuriantly is of prime importance, and as every information of this nature, at first hand from a practical collector and naturalist, is of value if placed on record, I have been induced to bring to light some rather old work done in H.M.S. 'Penguin' on the North-west coast of Australia. All the specimens were at the time sent to the British Museum, being presented by the Admiralty; and, as I have not seen them since, I am not able to give specific or definite names to the specimens, which at the time of collecting it was impossible to do.

The part worked over consisted of the Holothuria Bank off the Admiralty Gulf, and the Baleine Bank off Roebuck Bay, together with some examinations of the fringing-reefs of the various islands along the coast. The former is in lat. 13° - $13^{\circ} 30'$ S., long. $125^{\circ} 40'$ - $126^{\circ} 20'$ E., and extends a distance of 60 miles, being at nearest 14 miles from the coast and 100 from the 100-fathom line. The Baleine Bank is in lat. $15^{\circ} 40'$ S., long. $121^{\circ} 50'$ E., and is about 10 miles long.

The whole area was particularly noticeable for the remarkable abundance of (1) Aleyonarians; (2) Echinoderms, particularly the most beautiful Asterophytans; (3) the great quantity of calcareous Polyzoa of comparatively massive branching character. This region is a great centre of the pearl-shell fishery.

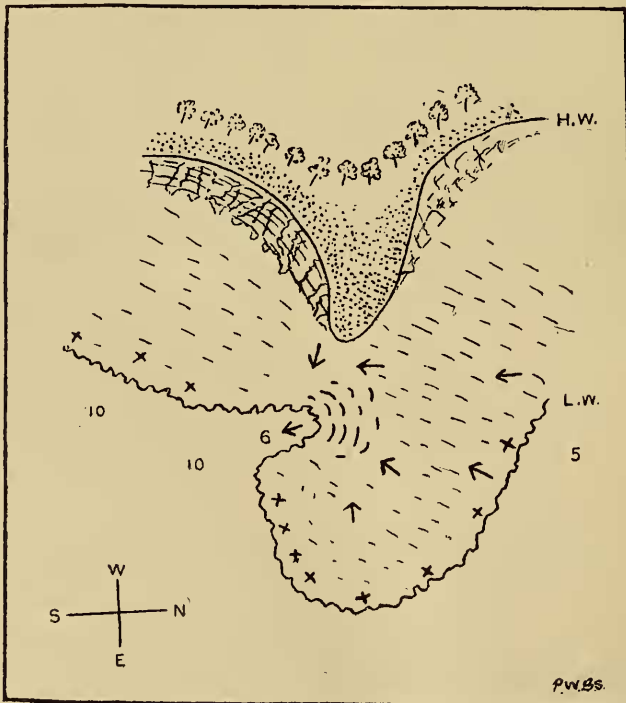
Mr. Stanley Gardiner, in his paper, states that the building-up is more rapid on the tops of the submarine undulations than in the hollows, from the deposit on them of the downward falling rain of foraminiferal tests, &c. Here I would point out that these strong branching calcareous forms of Polyzoa (including Retiporas) must, in depths of 30 to 60 fathoms at least, have a very great building-up power, for time after time the large swabs attached to the dredge-bag would come up perfectly entangled with broken-off branches, as if they had pulled over a little forest of these Polyzoa on a sandy surface, as was shown in my daily dredging report, where they were often described as very abundant and quite "massive."

In the more elevated portions of the Holothuria Bank, as on the Penguin reef, where there was only 15 fathoms, and on the Bassett-Smith shoal in 9-10 fathoms, the ordinary reef-corals were found (*Stylopora*, *Seriatopora*, *Astræa*, *Goniastrea*, *Plesiastrea*, *Phymastrea*, *Turbinaria*, *Montipora*, and *Porites*), though in shallow dredgings, 12-20 fathoms, on the Baleine Bank no corals at

all were obtained, either alive or dead, only great quantities of these low-branching Polyzoa. When we left the Australian coast for the Arafura Sea these general characters were absent.

Another peculiarity of this region was the great turbidity of the water near the coast and the large amount of slimy mud deposited on the flats, which as fringing-reefs were everywhere present, their seaward edge being marked by isolated, blackened, and elevated masses of coral-rock.

With such a considerable rise and fall of tide, 20 feet at springs, when walking on the reefs one was struck by seeing the large number of corals which were apparently able to stand a prolonged exposure to the blazing sun of this nearly equatorial latitude. Along with these tides there were strong and powerful currents, the average temperature of the water being 80°.



Reef on Troughton Island, N.W. Australia.

[← direction of current; soundings in fathoms. Tide-rise 20 feet.]

On the north end of Troughton Island, lat. 13° 40' S., long. 126° 10' E., the condition was as follows at nearly low-water springs:—The beach at high-water level was sand and shell, then

